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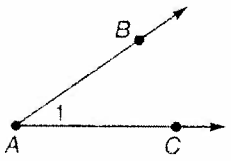
1-4 Study Guide and Intervention

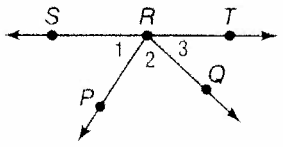
Angle Measure

Measure Angles If two noncollinear **rays** have a common endpoint, they form an **angle.** The rays are the **sides** of the angle. The common endpoint is the **vertex.** The angle at the right can be named as $\angle A$, $\angle BAC$, $\angle CAB$, or $\angle 1$.



A **right angle** is an angle whose measure is 90. An **acute angle** has measure less than 90. An **obtuse angle** has measure greater than 90 but less than 180.

Example 1



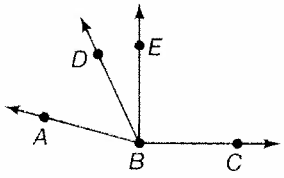
a. Name all angles that have *R* as a vertex.

Three angles are $\angle 1$, $\angle 2$, and $\angle 3$. For other angles, use three letters to name them: $\angle SRQ$, $\angle PRT$, and $\angle SRT$.

b. Name the sides of $\angle 1$.

$\overrightarrow{RS}$, $\overrightarrow{RP}$

Example 2 **Classify each angle as *right, acute,* or *obtuse.* Then use a protractor to measure the angle to the nearest degree.**



a. $\angle ABD$

Using a protractor, $m\angle ABD = 50$.
$50 < 90$, so $\angle ABD$ is an acute angle.

b. $\angle DBC$

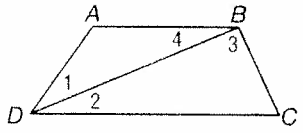
Using a protractor, $m\angle DBC = 115$.
$180 > 115 > 90$, so $\angle DBC$ is an obtuse angle.

c. $\angle EBC$

Using a protractor, $m\angle EBC = 90$.
$\angle EBC$ is a right angle.

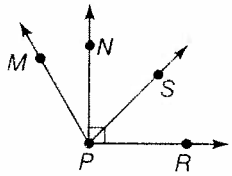
Exercises

Refer to the figure at the right.



1. Name the vertex of $\angle 4$.
2. Name the sides of $\angle BDC$.
3. Write another name for $\angle DBC$.

Classify each angle as *right, acute,* or *obtuse.* Then use a protractor to measure the angle to the nearest degree.



4. $\angle MPR$
5. $\angle RPN$
6. $\angle NPS$

Lesson 1-4

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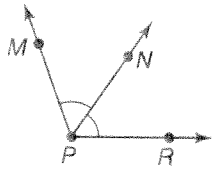
1-4 Study Guide and Intervention *(continued)*

Angle Measure

Congruent Angles Angles that have the same measure are **congruent angles.** A ray that divides an angle into two congruent angles is called an **angle bisector.** In the figure, $\overrightarrow{PN}$ is the angle bisector of $\angle MPR$. Point N lies in the interior of $\angle MPR$ and $\angle MPN \cong \angle NPR$.



Example **Refer to the figure above. If $m\angle MPN = 2x + 14$ and $m\angle NPR = x + 34$, find x and find $m\angle NPR$.**

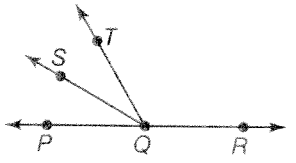
Since $\overrightarrow{PN}$ bisects $\angle MPR$, $\angle MPN \cong \angle NPR$, or $m\angle MPN = m\angle NPR$.

$$\begin{aligned} 2x + 14 &= x + 34 \\ 2x + 14 - x &= x + 34 - x \\ x + 14 &= 34 \\ x + 14 - 14 &= 34 - 14 \\ x &= 20 \end{aligned}$$

$$\begin{aligned} m\angle NPR &= 2x + 14 \\ &= 2(20) + 14 \\ &= 40 + 14 \\ &= 54 \end{aligned}$$

Exercises

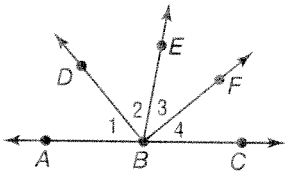
ALGEBRA In the figure $\overrightarrow{QP}$ and $\overrightarrow{QR}$ are opposite rays. $\overrightarrow{QS}$ bisects $\angle PQT$.



1. If $m\angle PQT = 60$ and $m\angle PQS = 4x + 14$, find the value of x.

2. If $m\angle PQS = 3x + 13$ and $m\angle SQT = 6x - 2$, find $m\angle PQT$.

ALGEBRA In the figure $\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays. $\overrightarrow{BF}$ bisects $\angle CBE$.



3. If $m\angle EBF = 6x + 4$ and $m\angle CBF = 7x - 2$, find $m\angle EBF$.

4. If $m\angle 3 = 4x + 10$ and $m\angle 4 = 5x$, find $m\angle 4$.

5. If $m\angle 3 = 6y + 2$ and $m\angle 4 = 8y - 14$, find $m\angle CBE$.

6. Let $m\angle 1 = m\angle 2$. If $m\angle ABE = 100$ and $m\angle ABD = 2(r + 5)$, find r and $m\angle DBE$.

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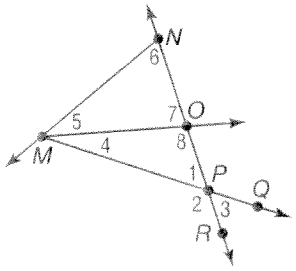
1-4 Practice

Angle Measure

For Exercises 1–10, use the figure at the right.



Name the vertex of each angle.

1. $\angle 5$
2. $\angle 3$
3. $\angle 8$
4. $\angle NMP$

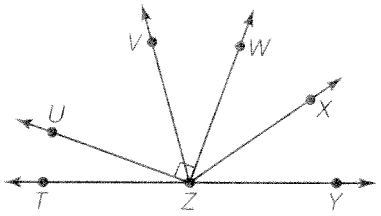
Name the sides of each angle.

5. $\angle 6$
6. $\angle 2$
7. $\angle MOP$
8. $\angle OMN$

Write another name for each angle.

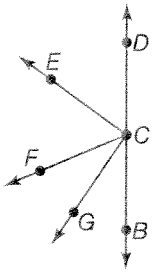
9. $\angle QPR$
10. $\angle 1$

Classify each angle as *right*, *acute*, or *obtuse*. Then use a protractor to measure the angle to the nearest degree.



11. $\angle UZW$
12. $\angle YZW$
13. $\angle TZW$
14. $\angle UZT$

ALGEBRA In the figure, $\overrightarrow{CB}$ and $\overrightarrow{CD}$ are opposite rays, $\overrightarrow{CE}$ bisects $\angle DCF$, and $\overrightarrow{CG}$ bisects $\angle FCB$.



15. If $m\angle DCE = 4x + 15$ and $m\angle ECF = 6x - 5$, find $m\angle DCE$.
16. If $m\angle FCG = 9x + 3$ and $m\angle GCB = 13x - 9$, find $m\angle GCB$.
17. **TRAFFIC SIGNS** The diagram shows a sign used to warn drivers of a school zone or crossing. Measure and classify each numbered angle.